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ABSTRACT

The Teaching Information Processing Systems (TIPS) is an elaborate and flexible computer program designed to amplify effective classroom instruction. It enables teachers to give individual instruction to large numbers of students, maintains student characteristics and achievement data, generates student progress reports, prescribes remedial or enrichment work, and reports individual and collective student performance in areas within the course. TIPS requires detailed course planning in advance, including scheduling of each unit and subdivision of learning objectives into conceptual areas. Surveys, performance criteria, and proficiency prescriptions must also be established. In experimental use at Riverside City College, two Macroeconomics classes were included in a pilot project with a third class used as a control. TIPS use was the only difference in instructional treatment. Regression analysis indicated that TIPS raised student performance on exams an average 6.7 points, yielding a 10% improvement at the .05 level. Constraints included budget, computer capacity, and the necessity of a TIPS Assistant to relieve the instructor of computer time demands. A complete model for the Macroeconomics class and sample TIPS readouts are appended. (RT)

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FINAL REPORT

TIPS IMPLEMENTATION AT RIVERSIDE CITY COLLEGE 1976-77

An Experiment in Educational Innovation

by

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Social Sciences Division

August 1, 1977

JC 220 379

TIPS IMPLEMENTATION AT
RIVERSIDE CITY COLLEGE 1976-77

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TIPS IMPLEMENTATION AT

RIVERSIDE CITY COLLEGE 1976-77

Introduction

The Teaching Information Processing Systems (TIPS) project at Riverside City College was funded by a grant from the Exxon Education Foundation under the IMPACT Program which is designed to encourage the adoption of proven educational innovations. Support of the pilot project was also rendered by the Board of Trustees of Riverside City College who approved the proposal and granted the institutional support necessary for implementation.

TIPS is nothing more than an elaborate and flexible computer program which, together with sound educational procedures, enables the teacher to individualize instruction with large numbers of students. The TIPS program has the capabilities of keeping student characteristics and achievement data, of generating student progress reports and individual prescriptions for remedial or enrichment work, and numerous reports for the teacher pertaining to individual and collective student performance in specific concept areas within the course.

TIPS is not a magic tool to teach students. Its success is predicated upon the amplification of the capabilities of the instructor. TIPS requires effective teaching. The instructor must have the overview and mastery of his subject matter in order to specify learning objectives, transmit knowledge, and select appropriate curricular materials. The instructor must also have at his command the knowledge of educational methodology to be able to formulate survey test items, prescribe appropriate assignments, make effective use of media, and evaluate learning outcomes. The TIPS program can only be as effective as the teacher who supplies its inputs, and the students who are

encouraged in their willingness to work and their ability to learn.

Implementation Activities

Implementation commenced with a TIPS Workshop held at Duke University under the direction of Professor Allen C. Kelley. The scheduled activities included the purposes and impact of TIPS, pedagogic design of a course using TIPS, specifying and writing learning objectives, construction of test items keyed to objectives, and an introduction to programming an instructional unit using the TIPS computer program.

The TIPS computer program was made available to Riverside City College in the Fall, 1976 semester. The first version was written for the IBM 360/50 computer at the University of California at Riverside. This version was originally to be used solely for "dry run" simulations of instructional units.

Under the provisions of the Exxon Education Foundation grant, Mr. Robert M. Schmidt of Duke University traveled to the R.C.C. campus to program, compile, and debug a production version of TIPS to be used on the in-house Burroughs B-1700 computer. The program worked beautifully. But execution times were abysmally long (4-6 hours) due to a lack of core memory on the B-1700. Trial executions on a B-1700 with augmented memory gave execution times of 5 minutes. Reluctantly, it was decided that production runs had to proceed during the Spring semester using the UCR facility and the on-campus 3780 car reader and printer. Such service proved to be inconvenient, undependable, slow, arbitrarily restrictive, and expensive.

It became the responsibility of the TIPS Assistant, Mrs. Janet Gropp, to interpret the User's Guide to TIPS in translating Dr. Thompson's detailed written instructions for each instructional unit into TIPS coding. Mrs. Gropp also handled the keypunching, submitted the IBM cards for processing, made error corrections revealed by diagnostics internal to the program, and did all typing pertinent to the project.

After several delays, the first six units of the TIPS Principles of Macroeconomics course were simulated prior to the beginning of actual use in the classroom during the Spring 1977 semester.

Pedagogical Procedures

Use of the TIPS proceedures requires detailed advanced planning of the course. Every unit must be scheduled in advance. Learning objectives for each topical unit must be further subdivided into several conceptual areas. Surveys of ten to twenty questions must be compiled for each unit and subdivided by concept area. Adequacy criteria of acceptable performance in each concept area must be established. Decision rules specifying appropriate prescriptions for students performing at various proficiency levels must be established.

The detailed course outline schedule for TIPS implementation in the Principles of Macroeconomics course is included as Appendix A. Surveys were normally scheduled on Friday (after discussion sessions or special instructional events) in order to facilitate computer processing.

Learning objectives were written for some fourteen instructional units. Within each instructional unit, learning objectives were further grouped according to content and concept areas. A sample of specific learning objectives for UNIT I (Basic Economic Concepts) is included as Appendix B. This unit is subdivided into five content/concept areas including: 1. Knowledge of terms and definitions, 2. Economic methodology, 3. Graphical analysis, 4. Pitfalls and fallacies in economics, and 5. Economics and economic policy. Learning objectives served as the basis for all lecture presentations.

Next, a TIPS survey was prepared to sample achievement of the specified learning outcomes. TIPS Survey No. 1 is included as Appendix C. The survey samples cognitive objectives in the five areas included in UNIT I by alloting

four questions to each content/concept area. Surveys varied from ten to twenty questions.

Since the TIPS computer program required inputs in a specified format, and since it would have been expensive to devise a special procedure for generating IBM cards from the optical scanner, answer sheets were created which were easy for students to fill out, and which could be readily keypunched. A sample answer sheet is included as Appendix D.

Next, decision rules and learning prescriptions were written for each concept/content area within UNIT I. If a student scored below a specified proficiency level, a remedial assignment was triggered. If a student scored above the minimum proficiency level, an optional "brush up" assignment was triggered. Students scoring 100% on a given content/concept area were sometimes given a congratulatory message, or found solace in the fact that no required assignment was prescribed. Students with perfect scores overall received an elaborate 100%! special printout. (These became collector's items.) Students who did not take the survey were recognized by the program and the standard assignment was prescribed. Sample decision rules and prescriptions for Survey No. 1 are included as Appendix E.

Next, the survey key, content/concept areas, decision rules, and prescriptions were all coded according to TIPS program requirements. After keypunching instuctor and student supplied information, the card deck was submitted for processing. CPU time on the IBM 360/50 was always within a 2-4 minute range. Each student received a printout detailing his performance on the survey and prescriptions designed to strengthen any areas where he showed weakness. No student was required to do "busywork." Each student was given an assignment tailored to his individual deficiencies and strengths. Sample "Student Progress Reports" are included as Appendices F, G, and H. Students with no required assignments were given full credit. Students with required assignments could receive full credit provided that they completed

their assignments satisfactorily.

In addition to individual student printouts, the instructor receives a dozen different reports on individual and collective student performance, as well as the run status of TIPS. These reports are useful in discovering which students are having difficulty, and in which content/concept areas instruction was effective or ineffective. By monitoring the instructional process in this manner, the teacher is alerted to problem areas in time to take corrective action (before the examination). One example of several such reports is included as Appendix I.

Examinations were of the one-hour multiple-choice variety. Questions were carefully selected to give a representative sampling of cognitive abilities in all content/concept areas. Questions asked on the examinations were not identical to those asked on the surveys. Indeed, many questions were derived from learning objectives that had not been previously assessed in the TIPS surveys. (The number of unit learning objectives always exceeded the number of test items on any survey.) Students sometimes complained that the examination questions were not the same as the survey questions. The TIPS procedure is not used as a means of teaching to a test. Rather, TIPS should be used to facilitate content/concept mastery. If this be so, then the student has accomplished more than simply memorizing an answer (a low-order cognitive skill). Content/concept mastery implies that the student can use economic facts, comprehension, analysis, and synthesis to answer a wide variety of questions. It is in the general applicability of economics that its study becomes an acquisition of value.

Implementation Costs

The following represents budgeted and actual expenditures under the externally funded project. The project director was authorized to reallocate funds up to 20 percent of the amount of the grant.

ITEM	BUDGETED	ACTUAL
TIPS Assistant	$1472.	$1444.50
TIPS Installation at R.C.C.	1750.	1750.00
Computer Time at U.C.R.	300.	412.04
Keypunching	155.	0.00
Supplies	100.	6.50
Telephone	50.	12.08
Final Report	100.	203.97

The largest difference between budgeted and actual expenditures occurred in computer time purchased at U.C.R. necessitated by inadequate campus computer facilities.

The expenditure of instructor time on the project also exceeded anticipated requirements. Part of the required time is of a nonrecurring nature inherent in any pilot project or in any detailed instructional procedure being tried for the first time.

TASK	TIME REQUIRED
Workshop (instructor training)	3 days or 24 hours
Learning Objectives	
2 hours per unit x 14 units	3.5 days or 28 hours
TIPS Surveys	
1 to 2 hours per unit x 14 units	2.6 days or 21 hours
Decision Rules and Prescriptions	
2 hours per unit x 14 units	3.5 days or 28 hours
Supervision of TIPS Assistant	
1 hour per unit x 14 units	1.75 days or 14 hours
Grading of TIPS Assignments	
4 hours per unit x 14 units (approximately 90 students)	7 days or 56 hours
Total Tasks	21 days or 171 hours

There were many miscellaneous problems, delays, and minor emergencies which required additional instructor time and energy. It can safely be said that TIPS is not a substitute for the labor of the instructor. TIPS is a complementary resource to be used in conjunction with the energies and abilities of a conscientious teacher. Were it not for the good fortune of a very capable TIPS Assistant, the time commitment required could have easily been doubled.

Once a TIPS course has been created, instructor time required should drop to approximately six hours per week for each class preparation. Given an experienced TIPS Assistant and reader help, instructor time commitment could be reduced to two hours per week of supervision, maintenance, and revision.

Evaluation

In order to evaluate the impact of TIPS on learning, three Principles of Macroeconomics classes were utilized in the pilot project. Two of these classes were designated as experiemental (using TIPS), and one class served as a control group. Lectures for all three classes were based upon specified learning objectives. Reading assignments were identical for all three classes. The same examinations were given to all classes. Every attempt was made to keep the instructional treatment identical for the experimental and control groups. The only difference in instructional treatment was the utilization of TIPS by the experimental classes.

TIPS was introduced to students as follows:

> We will be using a computerized Teaching Information Processing System (TIPS) to gear instruction to the individual student. Our aim is to improve your achievement in this course by providing you and the instructor with timely information on your understanding of specific economic concepts. This information allows the instructor to modify his classroom presentations, and facilitates the formulation of "decision rules" to generate individually prescribed assignments for students who exhibit weaknesses or strengths in specific content areas.

> Approximately each week you will be given a short (20 questions or less) quiz (survey) on course material recently covered. From your survey answers, an assignment will be generated by our campus computer. The due date on the assignment is noted on your assignment schedule. Some assignments will be of a suggested review nature, some will require that you answer questions in your textbook or study guide, some will require that you complete an individual study module at the IMC, and some assignments will be of an optional enrichment nature for extra credit. By taking TIPS surveys and doing the prescribed assignments, you should be well-prepared for the four hour-long examinations given throughout the course. No assignment will be of a "busywork" nature. Each assignment will be specifically geared to your grasp of course concepts.
>
> Past research has indicated that examination scores for the average student increase by around 15 percent using this system. Students who otherwise might find economics to be a difficult course benefit from TIPS even more than students who find it relatively easy.

Four achievement tests were given throughout the semester. In addition, the Test of Understanding in College Economics (TUCE) was administered as part of the final examination. The TUCE is a research instrument containing discriminatory questions involving recognition and understanding, simple application, and complex applications. The national norm for this test (posttest no pretest) for Form I-A is a mean of 58.1% correct with a standard deviation of 16.3.

The examination results are given in Table 1. In general, the experimental classes outperformed the control class. With the large standard deviations evident in the data, in only two instances (Exam II and Exam IV) could the differences be designated as statistically significant.

TABLE 1

	EXAM I	EXAM II	EXAM III	EXAM IV	TUCE I-A
EXPERIMENTAL					
GROUP 1	n=46	n=39	n=34	n=33	n=33
mean	67.5	66.3	70.3	73.8	60.6
S.D.	14.5	15.3	15.8	14.3	16.1
GROUP 2	n=40	n=38	n=35	n=35	n=35
mean	70.8	67.3	71.3	74.5	62.7
S.D.	13.3	15.0	13.8	15.0	17.3
CONTROL GROUP	n=21	n=18	n=17	n=16	n=16
mean	68.0	58.8	66.1	63.5	56.7
S.D.	15.0	17.5	17.7	19.0	20.0
SIGNIFICANCE TEST					
Student-t statistic (Pooled experimental verses control)	0.35	1.96	1.13	2.43	1.03
Degrees of freedom	105	93	84	82	82
Significance at level 0.05	n.s.d	significant	n.s.d.	significant	n.s.d.

Summary: For all five examinations, TIPS experimental classes outperformed the non-TIPS control class. However, using small-sample tests for the significance of the difference between mean scores, we may reject the null hypothesis of no significant difference (n.s.d.) in two cases (Exam II and Exam IV) where the TIPS classes significantly outperformed the non-TIPS class. For the remaining cases, the null hypothesis cannot be rejected.

A more refined approach to statistically evaluating the effectiveness of TIPS is to use multiple regression. All available factors which might affect student performance are included in a predictive equation. The hypothesis to be tested is simply whether the regression coefficient of the TIPS variable is positive and significantly different from zero at the 0.05 level. By holding "other things constant," the separate effect of the TIPS innovation on student achievement is revealed.

The two dependent variables selected were the average score on the four achievement tests, and the TUCE score. These are the variables to be "explained" by the independent variables.

The independent variables selected were continuous or dichotomous variables presumed to affect learning or predict achievement as follows:

1. CONS -- a constant (=1) overall observations which picks up the mean value of the dependent variable. This allows other independent variables to explain variation about the mean.

2. SCAT -- total score on the School and College Ability Test. The expected sign of the regression coefficient for this variable is positive, meaning the higher the student's SCAT score the better he should perform on the economics examinations. The mean SCAT score was 296.9 for all students.

3. GPA -- previous grade point average at R.C.C. Highly motivated students with good study skills should perform better on economics examinations than students who are unmotivated or have poor study skills. The expected sign of the regression coefficient is therefore positive. (The simple correlation coefficient between SCAT and GPA is +0.46. While this limits the usefulness of interpreting the respective regression coefficients and standard errors for these two variables, multicollinearity is not a serious problem.) The mean previous GPA was 2.75 for all students.

4. SEX -- a dichotomous variable indicative of student gender (0 = male, 1 = female). Previous research in economics education has sometimes indicated that females do not do as well in economics as males. The expected sign of the regression coefficient is therefore negative. Some 27% of the students in this study were female.

5. ETHNIC -- a dichotomous variable designating the student as Black or Mexican American/Chicano/Spanish Surname (0 = caucasian, 1 = minority). If minorities on average come from educationally disadvantaged backgrounds, the expected sign of the regression coefficient is negative. Some 14% of the students in this study were of ethnic minority backgrounds.

6. AGE -- chronological age as of June 1977. Older and more mature students are generally more serious students who have learned from experience. The expected sign of the regression coefficient is therefore positive. The mean age of students in this study was 23 years.

7. MS -- a dichotomous variable designating the student's marital status (1 = married, 0 = single, separated, divorced, or widowed). Married students are often more settled and less prone to dissipation. The expected sign of the regression coefficient is positive. Some 21% of the students in this study were married.

8. TRANS -- a dichotomous variable indicating that the student has declared that he or she wishes to transfer to a four-year institution (1 = transfer intention, 0 = unsure, or had vocational, general education, certificate, or job skill objective). Of the students in this study, 45% had indicated transfer intentions as their educational goal. The expected sign of the regression coefficient is positive since four-year colleges have admissions standards which students must meet.

9. BSMAJ -- a dichotomous variable indicating whether the student is a business major (1 = business major, 0 = other or undeclared). It is common for economic concepts to be included in business courses. The

expected sign of the regression coefficient is therefore positive. Some 39% of the students in this study were business majors.

10. TIPS -- a dichotomous variable designating whether the student was in experimental TIPS classes, or in the control group (1 = TIPS, 0 = control). Of the students in this study 80% were enrolled in one of the two experimental TIPS classes. The expected sign of the regression coefficient is positive.

Table 2 presents the regression results generated when the examination average was regressed on the ten independent variables.

TABLE 2

REGRESSION RESULTS

Dependent Variable: EXAM AVERAGE
(mean of dependent variable = 70.15)

	Independent Variable	Estimated Coefficient	Standard Error	T - Statistic
1.	CONS	-96.52	24.52	-3.94*
2.	SCAT	+ 0.49	0.09	+5.70*
3.	GPA	+ 7.45	1.87	+3.98*
4.	SEX	- 4.16	2.27	-1.84
5.	ETHNIC	- 1.20	3.18	-0.38
6.	AGE	- 0.08	0.21	-0.40
7.	MS	+ 1.21	3.51	+0.35
8.	TRANS	+ 1.96	2.14	+0.92
9.	BSMAJ	- 2.93	2.19	-1.34
10.	TIPS	+ 6.72	2.79	+2.41*

Number of Observations: N = 80

Coefficient of Multiple Determination: R^2 = 0.61

Standard Error of the Regression: S.E. = 8.57

Briefly, those independent variables with T-statistics designated by an asterisk (*) have regression coefficients significantly different from zero at the 0.05 level. The TIPS coefficient indicates that, holding all other factors constant, TIPS raised student performance on examinations by an average of 6.7 points. This represents a 10% improvement in the average examination score by students using TIPS. This improvement is statistically significant. The R^2 statistic indicates that 61% of the total variation of the dependent variable was explained by the independent variables.

Table 3 presents the regression results generated when the TUCE scores were regressed on the ten independent variables.

TABLE 3

REGRESSION RESULTS

Dependent Variable: TUCE I-A
(mean of dependent variable = 59.63)

Independent Variable		Estimated Coefficient	Standard Error	T - Statistic
1.	CONS	-186.83	39.54	- 4.73*
2.	SCAT	+ 0.75	0.14	+ 5.43*
3.	GPA	+ 8.78	3.02	+ 2.90*
4.	SEX	- 9.16	3.65	- 2.51*
5.	ETHNIC	+ 0.47	5.12	+ 0.09
6.	AGE	+ 0.15	0.34	+ 0.43
7.	MS	- 1.88	5.66	- 0.33
8.	TRANS	+ 1.01	3.45	+ 0.29
9.	BSMAJ	- 2.49	3.53	- 0.70
10.	TIPS	+ 1.01	4.50	+ 0.22

Number of Observations: N = 80

Coefficient of Multiple Determination: $R^2 = 0.52$

Standard Error of the Regression: S.E. = 13.82

Briefly, the use of TIPS raised the scores of students taking the TUCE by 1 point (holding all other factors constant). This represents a 2% improvement in average TUCE test scores resulting from the use of TIPS. While there are questions as to the content validity of the TUCE, TIPS did not contribute significantly to higher scores on this standardized test.

Attrition in the experimental and control groups from the fourth week of class to the end of the semester was about the same. In the experimental group, 27% failed to complete the course. In the control group 29% did not complete the course. Students in the TIPS classes knew their progress in the course at any point in time and thus had better information upon which they could base a decision to drop the class. Several students in the control group drifted along seemingly unaware of their status in the class. The reasons for students dropping a class are numerous and quite often unrelated to their academic ability. TIPS is not a method of dealing with the personal problems of students. It can alert the instructor to the fact that certain students are experiencing difficulties and should have personal attention or counseling.

Student reaction to TIPS was favorable. On the standard "Student Appraisal of Instruction" form, students were asked to indicate their opinion of TIPS. Some 56% of the responses were highly favorable to TIPS, while only 6% expressed unfavorable sentiments. The remaining 38% of the students were either neutral on the subject, or expressed no opinion.

Sample comments:

"The TIPS method is highly productive. It forces one to keep on top of the course, and at the same time it eliminates busywork."

"The TIPS system was highly effective because the assignments were concentrated in my weak areas."

"TIPS was good. It made me open the book each week instead of letting it pile up."

"TIPS shows you what you do and don't know."

"TIPS surveys encouraged (coerced?) reading and understanding of course material."

"I feel that the TIPS surveys are more work than they are worth."

Summary and Recommendations

TIPS enables the instructor to handle large numbers of students on an individualized basis. Because of refinement in the instructional process abetted by TIPS, course standards may be maintained and learning of difficult material significantly improved.

A number of factors stand in the way of continued use and widespread implementation of TIPS at Riverside City College. We do not have a computer on campus capable of handling production runs in a reasonable period of time. New memory has been added to the Burroughs B-1700 computer. As of the date of this report, this memory is not fully operational. Run times will be checked when this facility is improved. At least a ten-fold increase in execution speed would be necessary before TIPS production runs become feasible.

If an instructor is going to use TIPS, he requires the help of a TIPS Assistant (to handle the care and feeding of TIPS) and reader help (to expedite the grading of assignments for large numbers of students). Otherwise, TIPS becomes an unendurable drain on instructor energy and time. Most teachers (even conscientious ones) will not use TIPS under these conditions. Budget cuts have recently eliminated the possibility of support staff necessary for further TIPS implementation.

It is possible to improve the quality of education. This pilot project has demonstrated this point. Whether the incremental gain in learning achievement by students is worth the incremental cost of resources necessary to achieve that gain, is a judgment I leave to others. In education, as elsewhere, there is no free lunch. Conditions militate against further implementation of TIPS at Riverside City College at this time.

APPENDICES

Professor Fred A. Thompson — **Economics 7, Principles of Macroeconomics** — Spring, 1977
Riverside City College

Week (Mon.-Sun.)	Lecture (Dates)	Topics	Readings in Spencer for lecture	Regular TIPS Assignment (Due Date)	Laboratory/ Discussion Session	Memoranda
Jan. 31 - Feb. 6	Jan. 31	Basic Economic Concepts scarcity economizing	Ch. 1 Ch. 2, pp. 18-26		Feb. 4 (Friday) Introduction to Macroeconomics Policy Issues normative economics positive economics TIPS Survey #1	
	Feb. 2	Nature and Method of Economics fallacies modeling and theory				
Feb. 7 - Feb. 13	Feb. 7	The Production Possibility Model	Ch. 2, pp. 26-31	Feb. 9 first TIPS assignment due	Feb. 9 (Weds.) TIPS Survey #2	Feb. 11 (Fri.) Legal Holiday
	Feb. 9	The Mixed Economy capitalism (market) socialism (command)	Chapter 3			
Feb. 14 - Feb. 20	Feb. 14	Supply and Demand		Feb. 16 second TIPS assignment due	Feb. 18 (Friday) Aggregate Supply and Demand TIPS Survey #3	
	Feb. 16	Market Equilibrium	Ch. 4			
Feb. 21-27	Feb. 23	Distribution of Income Wealth Lorenz Curve Gini Coefficient	Ch. 5	Feb. 25 third TIPS assignment due	Feb. 25 (Friday) Policy Issue: Poverty and Income Maintenance TIPS Survey #4	Feb. 21 (Mon.) Legal Holiday
	Feb. 25	Distribution and Redistribution Determinants Evidence	Ch. 32			
Feb. 28 - Mar. 6	Feb. 28	The Public Sector taxation expenditure social goods spillover costs and benefits	Ch. 7	Mar. 2 fourth TIPS assignment due	March 2 (Weds.) First Hour Examination on material presented before Feb. 28 March 4 (Fri.) Exam results Public vs Private Sector	
Mar. 7 - Mar. 13	March 7	National Income Account	Ch. 8		March 11 (Friday) Film: "Gross National Product" TIPS Survey #5	
	March 9	Key Economic Indicators				
Mar. 14 - Mar. 20	March 14	Employment and Unemployment	Ch. 9	Mar. 16 fifth TIPS assignment due	March 18 (Friday) The Policy Issues of Economic Instability TIPS Survey #6	
	March 16	Inflation and Real Output				
Mar. 21 - Mar. 27	March 21	The Simple (private sector) Keynesian Model	Ch. 10	Mar. 23 sixth TIPS assignment due	March 25 (Friday) The Contribution of J. M. Keynes TIPS Survey #7	
	March 23	Sources of Economic Instability multiplier effect imperfect markets				

Mar. 28 - Apr. 3	March 28 March 30	The Keynesian Model with Government Spending The Keynesian Model with Taxation	Ch. 11	Mar. 30 seventh TIPS assignment due	April 1 (Friday) Defects of Keynesian Analysis TIPS Survey #8	
Apr. 4 - Apr. 10	April 4 April 6	Fiscal Policy countercyclical expenditure countercyclical taxation The Public Debt and Budget Philosophies	Ch. 12	April 6 eighth TIPS assignment due	April 8 (Friday) Second Hour Examination	April 11-15 Monday - Friday Spring Recess
Apr. 18 - Apr. 24	April 18 April 20	Money, Credit, and Financial Intermediation Fractional Reserve Commercial Banking	Ch. 13 Ch. 14		April 22 (Friday) The Role of Money in an Era of Electronic Transfers TIPS Survey #9	
Apr. 25 - May 1	April 25 April 27	Central Banking Techniques of Monetary Control	Ch. 15	Apr. 27 ninth TIPS assignment due	April 29 (Friday) The Fed as a Stabilizing or Destabilizing Influence? TIPS Survey #10	
May 2 - 8	May 2 May 4	The Quantity Theory classical modern The Liquidity Preference Theory	Ch. 16	May 4 tenth TIPS assignment due	May 6 (Friday) The Transmission of Monetary Policy TIPS Survey #11	
May 9 - May 15	May 9 May 13	Review of Monetary Policy Synthesis of Monetary and Fiscal Policy expanded model interaction		May 11 eleventh TIPS assignment due	May 11 (Weds.) Third Hour Examination	18
May 16 - May 22	May 16 May 18	Implementation of Economic Stabilization Policies Conflicts and Alternatives to Present Controls	Ch. 17		May 20 (Friday) Comparative Macroeconomic Performance TIPS Survey #12	
May 23 - May 29	May 23 May 25	The Determinants of Economic Growth resource base technology The Doomsday View classical Club of Rome	Ch. 18	May 25 twelfth TIPS assigment due	May 27 (Friday) "Doomsday or Utopia?" TIPS Survey #13	
May 30 - June 5	June 1	Costs and Benefits of Growth	Ch. 19 Ch. 20	June 1 thirteenth TIPS assigment due	June 3 (Friday) Economics and Ecology TIPS Survey #14	May 30 (Mon.) Legal Holiday
June 6 - June 12				fourteenth TIPS assignment due on the day of the Final Exam.		FINAL EXAM June 6 - 15

Appendix B

LEARNING OBJECTIVES

UNIT I. Basic Economic Concepts

1. Knowledge of Terms and Definitions

1.1 Identify the domain of economics as scarcity: expansive wants and limited resources.

1.2 Distinguish between microeconomics and macroeconomics by the level of aggregation used in analysis.

1.3 Recognition of economic activity as being composed of production, exchange, distribution, and consumption of goods and services.

1.4 Identify or define the four categories of economic resources.

1.5 List the three principal functions that any economic system must perform.

1.6 Enumerate three reasons for studying economics.

2. Economic Methodology

2.1 Explain the scientific method consisting of the processes of induction, deduction, and empirical verification.

2.2 Define economic theories.

2.3 Distinguish between economic theories, principles, and laws as a progression towards confidence in veracity.

2.4 Define a model as used in economics.

2.5 Identify the purposes of a model.

2.6 Distinguish between errors of omission and errors of comission.

2.7 Recognize geometric models as being mechanical analogs of mathematical models.

3. Graphical Analysis

3.1 Distinguish between dependent and independent variables.

3.2 Given a verbal statement of economic theory, express the statement numerically, mathematically, and graphically.

3.3 Given necessary data involving one dependent and one independent variable, graph the relationship and identify the slope of the line connecting the points as positive or negative.

3.4 Given a point, identify the (x,y) coordinates.

3.5 When shown graphical relationships, distinguish between direct, inverse, constant, or no relationship.

3.6 Calculate the slope of a graphed linear function.

3.7 Given a graphed, twice differentiable function, identify the value of the independent variable at which the dependent variable reaches a maxima or minima.

3.8 With a twice differentiable graphed function, distinguish between increasing or decreasing rates of change.

4. Pitfalls and Fallacies in Economics

4.1 Given a set of statements, select the statement exhibiting the least bias or special pleading.

4.2 Select a term which has different meanings in popular and economic usage.

4.3 Given statements exemplifying the following fallacy types, identify the fallacy of: false cause, appeal to the people, appeal to authority, composition, or division.

4.4 Recognize a situation where rumor or prediction elicits collective behavior indicative of a self-fulfilling prophecy.

5. Economics and Economic Policy.

5.1 Define positive and normative economics.

5.2 Given examples, distinguish between normative and positive statements.

5.3 Given two conflicting statements in economics, determine whether the conflict or issue may be resolved by appeal to fact.

5.4 Identify the elements of economic policy and the role of the economist (as economist) in analyzing policy issues.

5.5 Select situations which most clearly represent conflicts among stated economic goals.

5.6 Recognize the unlikely prospect of maximizing "benefits" and minimizing "detriments" simultaneously.

5.7 Identify situations where the "optimum" policy involves a trade-off between desirable alternatives.

Appendix C

Principles of Macroeconomics, Spring 1977, Dr. Thompson
TIPS Survey No. 1
Use the special answer sheet provided.

1. Economics is that social science concerned most generally with how:
   1) the government raises the taxes required for its activities
   2) businesses are managed under profit incentives
   3) society uses resources which are scarce relative to collective needs and desires
   4) stocks and bonds are bought and sold in securities markets

2. In macroeconomics, we would most probably analyze the:
   1) pricing and output decisions of a business firm
   2) exportation of wheat and the effect on the domestic price of bread
   3) total output, employment, income, and price level of the economy
   4) predicted effect of the production of synthetic food on agriculture

3. Economists sometimes classify economic resources into four basic categories called:
   1) capital, labor, land, and mineral deposits
   2) money, real and personal property, labor services, and stocks
   3) human resources, natural resources, capital goods, and entrepreneurship
   4) government resources, household resources, business resources, and labor resources

4. The principal functions of any economic system are to determine:
   1) who shall produce goods and services; what goods and services shall be produced; where will they be produced?
   2) what goods and services shall be produced; how shall they be produced; how shall these goods and services be distributed?
   3) who shall produce goods and services; how many shall be produced; how much shall these goods and services cost?
   4) what goods and services shall be produced; how many shall be produced; how shall they be produced?

5. The scientific method consists of the processes of:
   1) induction, deduction, and empirical verification
   2) hypothesis, theories, and laws
   3) theories, models, and graphs
   4) facts, conjectures, and opinions

6. An economic theory:
   1) is an abstract meaningful statement about complex phenomena
   2) will seldom (if ever) be wrong as a framework for analysis
   3) is really the same as a fact since for practical purposes the two are interchangeable
   4) is useful for organizing information according to the value systems of economists

7. An economic model is a(n):
   1) simplified framework for analysis
   2) attempt to replicate the real world
   3) useful device for generating data not readily observed
   4) mathematical statement with little relationship to reality

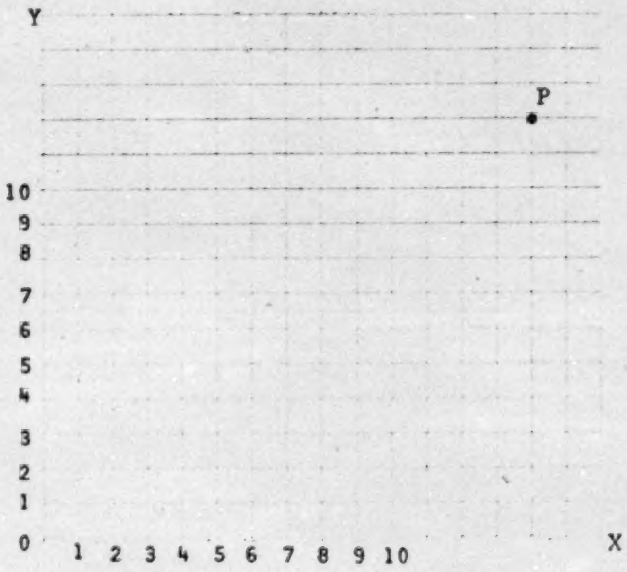
8. The equation y = 2x may be visually expressed by:
   1) a graph
   2) differentiation
   3) a mechanical model
   4) flow diagram

9. "During 1974 there was a substantial net outflow of financial resources from large oil-consuming nations to oil-producing nations. The situation was attributed to increases in the price of oil by oil-producing nations."

   In the above statement, the net outflow of financial resources is the ____ variable, and the price of oil is the ____ variable.

   1) independent, dependent
   2) dependent, independent
   3) independent, independent
   4) dependent, dependent

Use the following graph in answering questions 10 and 11:



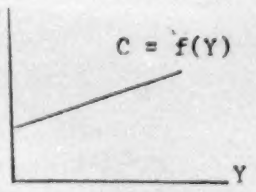
10.

y	x
0	0
1	1
4	2
9	3

Graph the relationship between y and x from the preceding data. The slope of the line connecting the points is:
   1) positive
   2) negative
   3) zero
   4) infinite

11. The (x, y) coordinates of point "P" on the preceding graph are:
   1) (11, 10)
   2) (14, 12)
   3) (13, 11)
   4) (12, 12)

12. The relationship depicted between variables C and Y is:
   1) inverse
   2) direct
   3) constant
   4) no relationship apparent



13. From the statements below, select the one which shows the least bias:
    1) under capitalism, the rich get richer, the poor get poorer; but under socialism income is more equally distributed, because of common ownership of production
    2) fundamental differences in property relationships exist between the United States and the Soviet Union; where, for the former, private ownership prevails: for the latter, public ownership prevails
    3) the Soviet Union is a godless, economic tyranny
    4) monopoly capitalists in the United States exploit the working class

14. Which of the following terms has a distinct meaning in economics which differs from popular usage?
    1) capital
    2) price
    3) output
    4) fallacy

15. Which of the following statements illustrates the fallacy of composition?
    1) investment is popularly thought of as money placed in bonds, stocks, etc., while to economists it means net additions to a nation's productive capacity
    2) people rush to sell G.E. stock in anticipation of a fall in price, thus causing the price to fall
    3) decreases in the rate of interest usually precede increases in home building; the interest fell yesterday; therefore, home building will necessarily increase
    4) "What's good for General Motors is good for the United States"

16. In a certain country there were rumors that a depression was coming and that unemployment would increase. The citizens began to save more of their income as a precaution. This caused sales to decline and many businesses had to lay off employees. This is an example of which of the following?
    1) a post hoc, ergo propter hoc situation
    2) fallacy of composition
    3) conflicting economic goals
    4) self-fulfilling prophecy

17. A positive economic statement can often be distinguished from a normative statement by:
    1) debating the issue
    2) appeal to factual evidence
    3) considering the worth of values
    4) a statement of opinion

18. Mr. J.C.: (I) "Unemployment is at an alltime high.
    (II) Therefore, government must pursue new policies to reduce unemployment."

    Mr. J.F.: (III) "Employment is at a record high and is increasing.
    (IV) Existing policies are moving the country in the right direction."

    Which parts of the conflict preceding statements by Mr. J.C. and Mr. J.F. may be resolved by appeal to fact?
    1) (I) and (II)
    2) (III) and (IV)
    3) (I) and (III)
    4) (II) and (IV)

19. Which of the following statements approximates the role of the economist in analyzing policy issues?
    1) "We must be good and just in satisfying our people's needs."
    2) "A $50-billion increase in government spending for this purpose would lower unemployment by 0.1 percent."
    3) "We have been paying too much attention to full employment and not enough attention to inflation."
    4) "The number-one domestic priority in this country ought to be education."

20. Which of the following statements correctly depicts the trade-off dilemma in policy-making?
    1) With an optimal mix of policies, all goals may be achieved simultaneously.
    2) Actions undertaken to attain one economic goal may hinder the attainment of another goal.
    3) By pursuing one objective, we simultaneously achieve another objective as a result of achieving the first.
    4) Among special interest groups, there is no necessary conflict when their goals are parallel.

Student Name: _____
(last, (first)

TIPS SURVEY ANSWER SHEET

Please fill out the requested information accurately. Ignore the number at the top of the coding spaces (they are for keypunching purposes).

Survey Number: 1 2 [ ][ ]

Student Number: 9 10 11 12 13 14 [ ][ ][ ][ ][ ][ ]

Your Answers:

25 [ ]

16	17	18	19	20	21	22	23	24	25
1: [ ]	2: [ ]	3: [ ]	4: [ ]	5: [ ]	6: [ ]	7: [ ]	8: [ ]	9: [ ]	10: [ ]
26	27	28	29	30	31	32	33	34	35
11: [ ]	12: [ ]	13: [ ]	14: [ ]	15: [ ]	16: [ ]	17: [ ]	18: [ ]	19: [ ]	20: [ ]

APPENDIX D

Appendix E

SAMPLE DECISION RULES AND PRESCRIPTIONS FOR SURVEY 1

General Instructions to the Student: All written assignments are to be handed in for grading at the class meeting of Wednesday, February 9.

Concept Area 1: Knowledge of Terms and Definitions

Question Grouping 1: Questions 1-4
Each question weighted equally.

1. Decision Rule: Students whose score on Grouping 1 is 75% or above.

   Prescription: You have a good grasp of basic economic concepts. Be sure to review using your Study Guide prior to the first examination. (Optional)

2. Decision Rule: Students whose score on Grouping 1 is from 50 through 75%.

   Prescription: Write out the definitions of the first four terms listed on page 11 of your textbook (1. Terms and Concepts to Review:). Explain the specific meaning of "scarcity" and "economizing" in economics.

3. Decision Rule: Students whose score on Grouping 1 is less than 50%.

   Prescription: Answer true-false questions nos. 1, 2, 9 on pages 5 and 6 of your Study Guide. Also answer true-false questions nos. 1, 2, 6, 9, 10, 11 on page 12. For each question, state briefly why the statement is true or false.

Concept Area 2: Economic Methodology

Question Grouping 2: Questions 5-8
Each question weighted equally.

1. Decision Rule: Students whose score on Grouping 2 is 75% to 99%.

   Prescription: To further your understanding of economic methodology, answer question 4 on page 12 of your textbook.

2. Decision Rule: Students whose score on Grouping 2 is from 50 through 74%.

   Prescription: Answer true-false questions 3, 4, 5 on page 5 of your Study Guide. After each question explain briefly why the statement is true or false.

3. Decision Rule: Students whose score on Grouping 2 is less than 50%.

   Prescription: Answer questions 1, 3, and 4 on page 7 of your Study Guide (Questions for Discussion).

Concept Area 3: Graphical Analysis

Question Grouping 3: Questions 9 - 12
Each question weighted equally.

1. Decision Rule: Students whose score on Grouping 3 is 100%.

   Prescription: Your understanding and interpretation of graphs will prove useful to you throughout this course.

2. Decision Rule: Students whose score on Grouping 3 is 0 through 75%.

   Prescription: Pick up the handout called ISM-1 (model building -- constructing and applying graphic models). After completing the independent study module at the Instructional Media Center, turn in Test 1 which accompanies the handout.

Concept Area 4: Pitfalls and Fallacies in Economics

Question Grouping 4: Questions 13-16
Each question weighted equally.

1. Decision Rule: Students whose score on Grouping 4 is 75% or above.

   Prescription: If you feel unsure about your understanding of fallacies and pitfalls in economic reasoning, review fill-in questions 11 through 18 in your Study Guide. (Optional)

2. Decision Rule: Students whose score on Grouping 4 is 50 through 74%.

   Prescription: Define and illustrate each of the fallacies listed in behavioral objective number 10, on page 7 of your Study Guide.

3. Decision Rule: Students whose score on Grouping 4 is less than 50%.

   Prescription: Answer questions 9, 10, 14, 16 and 20 on pages 12 and 13 of your textbook.

Concept Area 5: Economics and Economic Policy

Question Grouping 5: Questions 17 - 20
Each question weighted equally.

1. Decision Rule: Students whose score on Grouping 5 is 75% or above.

   Prescription: To further your understanding of economics and economic policy, complete question 4 on page 7 (Questions for Discussion) of your Study Guide. (Optional)

2. Decision Rule: Students whose score on Grouping 5 is less than 74%.

   Prescription: Distinguish between normative statements and positive statements in economics and give two examples of each. Why do policy issues involve both?

Composite Score on Survey 1

1. Decision Rule: The students who score 90% or above overall.

   Prescription: Your survey indicates that you have a firm grasp of the basic concepts presented thus far. Keep up the good work.

2. Decision Rule: Students whose composite score is less than 50%.

   Prescription: Your survey results reveal that you are having difficulty mastering the basic concepts of this course. Please see Professor Thompson if you are experiencing some difficulty for which he may provide assistance.

Class Message

Notice: Unless your assignments are designated "optional," the deadline for turning in the work prescribed is Wednesday, February 9 by the end of your class meeting.

Appendix F

TIPS
STUDENT PROGRESS REPORT
PRINCIPLES OF MACROECONOMICS (07)
PROFESSOR FRED A. THOMPSON

NOSHOW JOE
ID # 112308
SECTION # 51, 9:00 AM MWF
SECTION LEADER: MR. THOMPSON

SURVEY # 4 (02/28/77)
WEALTH AND INCOME DISTRIBUTION

OUR RECORDS INDICATE THAT YOU DID NOT TAKE THE SURVEY ON 02/28/77. AS A RESULT, AT THIS TIME WE DO NOT HAVE ANY DIRECT INDICATION OF YOUR UNDERSTANDING OF THE MATERIAL COVERED BY THIS SURVEY. IN THESE SITUATIONS, WE ASSIGN CERTAIN READINGS OR PROBLEMS WHICH ASSURE US THAT YOU ARE FAMILIAR WITH THE MINIMUM TOOLS NEEDED TO MASTER THIS ASPECT OF THE COURSE. THIS ASSIGNMENT IS NOT A PENALTY. RATHER, IT IS A MEANS OF ENSURING THAT WE HAVE PROVIDED YOU WITH THE TOOLS NEEDED TO MASTER MORE ADVANCED CONCEPTS.

ALL WRITTEN ASSIGNMENTS ARE TO BE HANDED IN FOR GRADING AT THE CLASS MEETING OF WEDNESDAY, MARCH 2.

WEALTH AND INCOME

--PICK UP THE HANDOUT CALLED ISM-27 (WEALTH, CAPITAL, AND INVESTMENT). AFTER COMPLETING THE INDEPENDENT STUDY MODULE AT THE INSTRUCTIONAL MEDIA CENTER, TURN IN TEST 27 WHICH ACCOMPANIES THE HANDOUT.

MEASURES OF INCOME DISTRIBUTION

--PICK UP THE HANDOUT CALLED ISM-28 (DISTRIBUTION OF INCOME). AFTER COMPLETING THIS INDEPENDENT STUDY MODULE AT THE INSTRUCTIONAL MEDIA CENTER, TURN IN TEST 28 WHICH ACCOMPANIES THE HANDOUT.

POVERTY AND INCOME REDISTRIBUTION

--ANSWER QUESTIONS 3 and 5 ON PAGE 289 OF YOUR STUDY GUIDE. BE SURE THAT YOU DESCRIBE AT LEAST THREE INCOME MAINTENANCE ALTERNATIVES TO WELFARE IN QUESTION 5.

NOTICE: THE FIRST HOUR EXAMINATION WILL BE HELD ON WEDNESDAY, MARCH 2 ON ALL MATERIAL TO DATE. PLEASE BRING A NO. 2 PENCIL. THE FIRST EXAM WILL CONSIST OF 40 MULTIPLE-CHOICE QUESTIONS. IF YOU HAVE KEPT UP WITH YOUR STUDYING BY ATTENDING CLASS, READING ASSIGNED MATERIALS, AND COMPLETING YOUR TIPS PRESCRIPTIONS, YOU SHOULD BE WELL-PREPARED.

Appendix G

TIPS
STUDENT PROGRESS REPORT
PRINCIPLES OF MACROECONOMICS (07)
PROFESSOR FRED A. THOMPSON

NOSTUDY NEVELLE
ID # 129185
SECTION # 51, 9:00 AM MWF
SECTION LEADER: MR. THOMPSON

SURVEY # 10 (04/29/77)
FED MONETARY CONTROLS

YOU CORRECTLY ANSWERED 7 OUT OF THE 15 QUESTIONS ON THIS SURVEY. THE FOLLOWING TABLE SUMMARIZES YOUR ANSWERS AS WELL AS THE CORRECT ANSWERS FOR THIS SURVEY. YOU ARE URGED TO MAKE SURE THAT YOU UNDERSTAND THE NATURE OF ANY INCORRECT RESPONSES WHICH YOU MADE.

T A B L E O F R E S P O N S E S

QUES. NUMB.	YOUR ANSW.	CORR. ANSW.	QUES. NUMB.	YOUR ANSW.	CORR. ANSW.	QUES. NUMB.	YOUR ANSW.	CORR. ANSW.
1.	2	1	6.	1	1	11.	1	4
2.	1	3	7.	4	3	12.	3	2
3.	4	1	8.	1	1	13.	4	3
4.	2	3	9.	3	3	14.	3	3
5.	3	3	10.	4	4	15.	1	1

ALL PRESCRIBED WRITTEN WORK IS TO BE COMPLETED AND TURNED IN FOR GRADING AT THE CLASS MEETING OF WEDNESDAY, MAY 4.

QUANTITATIVE CONTROLS OF THE FED

--PREPARE AND TURN IN WRITTEN ANSWERS TO BEHAVIORAL OBJECTIVES NO. 2 AND NO. 6 FOUND ON PAGE 131 OF YOUR STUDY GUIDE. (THESE OBJECTIVES DEAL WITH RESERVE REQUIREMENTS AND OPEN-MARKET OPERATIONS.)

QUALITATIVE CONTROLS OF THE FED

--YOU MISSED ONE QUESTION IN THE CONCEPT AREA OF QUALITATIVE MONETARY CONTROLS. REVIEW QUESTIONS SEVEN THROUGH NINE ON YOUR SURVEY AND TRY TO UNDERSTAND THE CORRECT RESPONSES.

MONETARY POLICY

--ANSWER TRUE-FALSE QUESTIONS NOS. 9,10,11 AND 12 ON PAGES 129 AND 130 OF YOUR STUDY GUIDE. AFTER EACH QUESTION, EXPLAIN BRIEFLY IN WRITING WHY THE STATEMENT IS TRUE OR FALSE.

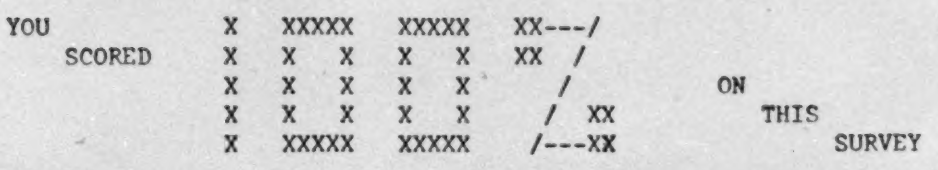
NOTICE: ALL STUDENTS WILL RETURN THEIR SURVEY 10 PRINTOUTS TOGETHER WITH ANY PRESCRIBED WRITTEN WORK ON WEDNESDAY, MAY 4 AT THE TIME OF YOUR CLASS MEETING. NO LATE WORK WILL BE GRADED OR ACCEPTED FOR CREDIT.

Appendix H

TIPS
STUDENT PROGRESS REPORT
PRINCIPLES OF MACROECONOMICS (07)
PROFESSOR FRED A. THOMPSON

SHARPE STUDENT
ID # 115686
SECTION # 53, 11:00 AM MWF
SECTION LEADER: MR. THOMPSON

SURVEY # 13 (05/27/77)
ECONOMIC GROWTH



FOR YOUR RECORDS, THE CORRECT ANSWERS FOR THE 12 QUESTIONS ON THIS SURVEY ARE 3 4 3 4 4 2 1 1 3 4 3 2

ALL WRITTEN ASSIGNMENTS ARE TO BE HANDED IN FOR GRADING AT THE CLASS MEETING OF FRIDAY, JUNE 3.

ECONOMIC GROWTH CONCEPTS

CLASSICAL GROWTH THEORY

U.S. ECONOMIC GROWTH

NOTICE: SURVEY 13 PRINTOUTS TOGETHER WITH ANY PRESCRIBED WRITTEN ASSIGNMENTS ARE TO BE TURNED IN ON FRIDAY, JUNE 3 FOR GRADING. NO LATE WORK WILL BE GRADED OR ACCEPTED FOR CREDIT.

TIPS
PROFESSOR'S SUMMARY REPORT

PRINCIPLES OF MACROECONOMICS (07)
PROFESSOR FRED A. THOMPSON

	CLASS
NUMBER OF STUDENTS	96
NUMBER TAKING TEST # 1 -- BASIC ECONOMIC CONCEPTS	93
NUMBER RECEIVING STUDENT REPORT # 01 -- BASIC ECONOMIC CONCEPTS	96

TABLE OF AVERAGE SCORES — AVERAGE PCT. CORRECT

FILE	LABEL	CLASS (N= 93)
G151 --	SURVEY 1: BASIC ECONOMIC CONCEPTS ALL 20 QUESTIONS ON THE TEST	76.8
G152 --	KNOWLEDGE OF TERMS AND DEFINITIONS QSTS 1,2,3,4	87.6
G153 --	ECONOMIC METHODOLOGY QSTS 5,6,7,8	63.7
G154 --	GRAPHICAL ANALYSIS QSTS 9,10,11,12	81.7
G155 --	PITFALLS AND FALLACIES QSTS 13,14,15,16	79.6
G156 --	ECONOMICS AND ECONOMIC POLICY QSTS 17,18,19,20	71.2

ITEM ANALYSIS TABLE

NO.	ANS.	PERCENT CORRECT	PERCENT IN CLASS SELECTING ALTERNATIVE RESPONSES					
		CLASS (N= 93)	1	2	3	4	5	NO RESP.
1	3	98	0	1	98	0	0	1
2	3	98	1	1	98	0	0	0
3	3	90	0	0	90	2	0	0
4	2	65	3	65	14	17	0	1
5	1	68	68	15	15	1	1	0
6	1	33	33	3	4	59	0	0
7	1	56	56	28	15	1	0	0
8	1	98	98	0	2	0	0	0
9	2	68	22	68	1	9	0	1
10	1	80	80	14	1	5	0	0
11	2	95	2	95	1	2	0	0
12	2	85	5	85	8	2	0	0
13	2	84	9	84	3	3	0	1
14	1	88	88	2	2	8	0	0
15	4	88	2	4	5	88	0	0
16	4	58	82	1	9	58	0	0
17	2	86	4	86	4	5	0	0
18	3	60	12	9	60	19	0	0
19	2	55	16	55	26	3	0	0
20	2	84	4	84	10	2	0	0

Appendix J

TIPS

FINAL REPORT ADDENDUM

1. How well did TIPS fit conceptually with your philosophy of education and/or your practice in teaching? Do you have a different view of TIPS now than you did after you read the materials? After you attended the workshop?

   TIPS fits in well with my educational training and philosophy. I outlined the procedure to be followed in the summer of 1968 before I met A.C. Kelley at Stanford University. In fact we published articles which together were included in Recent Research in Economics Education edited by Keith Lumsden and published by Prentice Hall in 1970. I viewed TIPS then (and now) as a vehicle for implementing a systematically organized course with learning objectives, instructional events, evaluation, and remediation.

2. Did you modify TIPS in implementing it in your course, and, if so, how? (Did you use only aspects of it? Did you stress certain features more than others? Did you change or add procedures?) What considerations or experiences prompted the modifications you made?

   We used the basic TIPS features in our initial implementation. I tied student performance on the surveys to the grading system by giving full credit to those who scored at a satisfactory level, and by giving full credit to others who completed their prescribed assignments in a satisfactory manner. It is my experience that some reward must be offered students to elicit the learning behavior conducive to subject-matter mastery.

3. Was your course modified in unexpected ways by the introduction of TIPS? Has the use of TIPS in your course changed your teaching style in any ways which you had not anticipated?

   My course was more highly organized under TIPS than previously. There were many more learning options open to students than ever before, including remedial and extra credit enrichment assignments. My classroom teaching style remained based upon learning objectives as my lectures spring somewhat spontaneously from such sources.

4. How much time did you anticipate it would take you to implement TIPS? Did this turn out to be too little, too much, or about right? What particular phases of the implementation process took more or less time than you had anticipated?

   It took an excessive amount of time to implement TIPS. Delays in getting the program, and the inexorable operation of Murphy's First Law ("If anything can go wrong, it will") and Murphy's Second Law ("even if anything can't possibly go wrong, it will") created vexations too numerous to mention. The implementation of TIPS imposed an excessive drain on my time and energies. I did not have the released or reassigned time necessary to accomoplish my tasks in a tranquil manner. It is imperative that instructors have the time scheduled to do such a project expeditiously. My circumstances at our college did not allow this.

5. What individuals or factors on your campus have helped most in implementing TIPS?

6. What individuals or factors on your campus have hindered the implementation of TIPS most?

The only factor which facilitated the actual implementation of TIPS on our campus was my capable TIPS assistant. Our Director of Computer Services tried to be accommodating, but his computer was unable to handle the production runs. All other factors were neutral. I have two fat file folders of required project paperwork to demonstrate that my time was often devoted to tasks other than the educational aspects of TIPS. Only a small part of this paperwork was required by the Foundation.

7. Which aspects of the Foundation's role in the implementation process were most helpful? Which were least helpful?

The Foundation should realize that class schedules are established well in advance of their decisions to grant (or not to grant). Educational institutions are most inflexible. When a proposal states a specific time for implementation, every effort should be made by the Foundation to either adhere to that time frame, or let the grantee know at least six months in advance what project schedule can be accommodated.

Implementation of our project was delayed from the Summer of 1976, to the Fall of 1976, to the Spring of 1977.

8. How did you use the money provided by your grant? In what ways did the actual spending differ from your preliminary plans? Were the funds provided adequate, more than enough, or too little for the implementation process as you carried it out?

Budgeted and actual expenditures are included in the Final Report. We had to spend an excessive amount of money on off-campus computer time. To make this possible, I cut down and scrimped on everything else. This effort further increased the work load devolving upon the project director.

9. What measures did you use to assess the impact of TIPS on student performance and attitued? What were the results of this evaluation?

The assessment of the effectiveness of TIPS is included in my Final Report.

10. If another person in your field were considering implementation of TIPS, would you encourage him to do so? Why or why not? What would you tell him were the major problems he might expect to encounter in attempting implementation, and what suggestions would you make to him for overcoming these problems? What specific advice would you give him concerning appropriate subject matter, student populations, class size and organization, etc.?

I would encourage another instructor in any field where objective tests may be used to implement TIPS providing that:

a. At least 2/5 released or reassigned time is granted by the educational institution for one quarter or semester to plan and simulate the implementation of TIPS.

b. A proven version of the TIPS program is available for use with adequate on-campus computer facilities for production runs.

c. Good support services may be expected for keypunching and production runs.

d. Adequate support in the form of an able TIPS assistant and competent reader help is available to handle the routine chores of coding, debugging errors, distributing reports, and correcting the prescribed assignments for students.

If any of these conditions are lacking, even the most conscientious, able, and enthusiastic instructor will find TIPS implementation an onerous task.

Appendix K

Name of Institution:	Riverside City College 4800 Magnolia Avenue Riverside, CA 92506
Name and Address of Project Director:	Dr. Fred A. Thompson 2816 Sandberg Street Riverside, CA 92506

TIPS

Implementation History

1. On what computer (brand, model, language) did you implement TIPS?

   The TIPS program was modified for use on our Burroughs B-1726 computer with 48 K memory. (The Burroughs concept supplements this with "virtual memory" by means of its operating system.) Actual production runs were conducted using an IBM 360/50 (REGION = 200 K) located on the University of California at Riverside campus. Both programs were written in FORTRAN made available only in object form.

2. Were there any difficulties in getting the program to run on your computer?

   The TIPS program ran fine on the Burroughs computer. Execution times were, however, four to six hours. Our Burroughs is currently being upgraded to an 81 K memory configuration. Run times using TIPS will be conducted when this modification is completed.

3. In what discipline and course did you use TIPS?

   Economics: Principles of Macroeconomics.

4. How many students were enrolled in the course?

   Approximately 90 students enrolled in two classes actually used TIPS in this pilot project.

5. What were the characteristics of the group (class level, major/non-major, etc.)?

   Student Characteristics:

   --School and College Ability Test Score
   mean = 296.9
   S.D. = 13.3

   --Grade Point Average Prior to Macroeconomics
   mean = 2.75
   S.D. = 0.62

   --Gender
   27% female
   73% male

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--Black or Chicano
14%

--Chronological Age
mean = 23.1 years
range = 18 to 47 years

--Marital Status
21% married

--Stated Transfer Intention to a Four-Year Educational Institution
45%

--Major
39% Business majors
61% other or undecided

6. How many weeks does the course run?

The course runs for appxoimately 17 weeks (one semester).

7. How many TIPS surveys did you give?

I gave fourteen TIPS surveys which varied from 10 to 20 questions over the semester course.

8. Do you plan to continue using TIPS in your course?

Conditions on our campus militate against the continued use of TIPS.

9. Have you any plans to extend use of TIPS to other courses you teach? Which ones?

I would have liked to have extended use of TIPS to the Principles of Microeconomics course.

10. Are there any other faculty members in your institution using TIPS? If so, please list their names and departments.

No other faculty member on this campus in our present circumstances has sufficient masochistic tendencies to attempt the implementation of TIPS in their courses.

11. Are there any other faculty members in your institution planning to use TIPS? If so, please list their names and departments.

No other faculty members plan to use TIPS. I have a bastardized version of TIPS for use on our HP-2000 interactive computer. It is little more than a quiz generation program. One faculty member may make limited use of that program. Again, it requires a considerable amount of instructor time to incorporate it into a well-planned course.

Fred G. Thompson
Signature

August 1, 1977
Date